PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent No. 6,980,656	)	Serial No. 09/317,124
	)	
Inventor(s): Daniel E. HINTON *et al*	)	Filed: May 24, 1999
	)	
Issue Date: December 27, 2005	)	Attorney Docket No. 000479.77772

For: CHAOTIC COMMUNICATION SYSTEM AND METHOD USING MODULATION OF NONREACTIVE CIRCUIT ELEMENTS

REQUEST FOR CERTIFICATE OF CORRECTION

U.S. Patent and Trademark Office
Customer Service Window
Randolph Building, Mail Stop: Certificate of Correction Branch
401 Dulany Street
Alexandria, VA 22314

Sir:

Pursuant to 35 U.S.C. § 254 and 37 C.F.R. § 1.322, this is a request for the issuance of a Certificate of Correction in the above-identified patent. Two (2) copies of PTO Form 1050 are appended. The complete Certificate of Correction involves one page.

The mistakes identified in the appended Form occurred through no fault of the Applicants, as clearly disclosed by the records of the application, which matured into this patent. Enclosed for your convenience are the relevant portions of the claims filed May 24, 1999 and the Examiner's Amendment enclosed with the Notice of Allowance dated July 21, 2005.

Issuance of the Certificate of Correction containing the corrections is respectfully requested. Since these changes are necessitated through no fault of the Applicants, no fee is believed to be associated with this request. Nonetheless, should the Patent and Trademark Office determine that a fee is required, please charge our Deposit Account No. 19-0733.

Respectfully submitted,

BANNER & WITCOFF, LTD.

By _____
Bradley C. Wright
Registration No. 38,061

Dated: May 5, 2006

1001 G Street, N.W. (11th Fl.)
Washington, D.C. 20001
(202) 824-3000

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.: 6,980,656

DATED: December 27, 2005

INVENTOR(S): Daniel E HINTON *et al*

It is certified that errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 59, Claim 11, Line 52:
Please replace "C," with --C_1--

In Column 68, Claim 37, Line 5:
Please replace "chances" with --changes--

In Column 68, Claim 40, Line 53:
Please replace "Plurality" with --plurality--

In Column 70, Claim 43, Line 26:
Please replace "Periods" with --periods--

Mailing Address of Sender:

Banner & Witcoff, Ltd.
11th Floor
1001 G Street, N.W.
Washington, DC 20001-4597

FORM PTO 1050 (Rev.2-93)

U.S. PAT. NO 6.980.656

No. of add'l copies
@ $0.50 per page

☐

MAY 09 2006

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.: 6,980,656

DATED: December 27, 2005

INVENTOR(S): Daniel E HINTON *et al*

It is certified that errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 59, Claim 11, Line 52:
Please replace "C," with --C_1--

In Column 68, Claim 37, Line 5:
Please replace "chances" with --changes--

In Column 68, Claim 40, Line 53:
Please replace "Plurality" with --plurality--

In Column 70, Claim 43, Line 26:
Please replace "Periods" with --periods--

Mailing Address of Sender:

Banner & Witcoff, Ltd.
11th Floor
1001 G Street, N.W.
Washington, DC 20001-4597

FORM PTO 1050 (Rev.2-93)

U.S. PAT. NO 6.980.656

No. of add'l copies
@ $0.50 per page

☐

MAY 09 2006

NEW UNITED STATES UTILITY PATENT APPLICATION

under 37 C.F.R. 1.53(b)

Atty. Docket No. 00479.07772

Assistant Commissioner of Patents
Box Patent Applications
Washington, D.C. 20231

Enclosed herewith is a new patent application and the following papers:

First Named Inventor (or application identifier): Daniel E. Hinton, Sr. et al

Title of Invention: CHAOTIC COMMUNICATION SYSTEM AND METHOD USING MODULATION OF NONREACTIVE CIRCUIT ELEMENTS

1. ■ Specification 125 pages (including specification, claims, abstract) / 159 claims (34 independent)

2. ■ Declaration/Power of Attorney is:
   - ■ attached in the regular manner.
   - ☐ NOT included, but deferred under 37 C.F.R. § 1.53(f).

3. ■ 88 Distinct sheets of ☐ Formal ■ Informal Drawings

4. ☐ Preliminary Amendment.

5. ☐ Information Disclosure Statement
   - ☐ Form 1449
   - ☐ A copy of each cited prior art reference

6. ■ Assignment with Cover Sheet.

7. ☐ Priority is hereby claimed under 35 U.S.C. § 119(e) based upon the following application(s):

Country	Application Number	Date of Filing (day, month, year)

8. ☐ Priority document(s).

9. ☐ Statement Claiming Small Entity Status.

10. ☐ Microfiche Computer Program (Appendix).

11. ☐ Nucleotide and/or Amino Acid Sequence Submission.
   - ☐ Computer Readable Copy.
   - ☐ Paper Copy (identical to computer copy).
   - ☐ Statement verifying identity of above copies.

a nonreactive resistive value in the chaotic circuit in accordance with an information signal and thereby causes the first equilibrium point to shift to a shifted first equilibrium point; and wherein the receiver comprises

a second oscillator circuit;

a second resistor coupled to the second oscillator circuit;

a second chaotic circuit coupled to the second oscillator circuit through the second resistor; and

a detector coupled to the second oscillator circuit and the second chaotic circuit;

wherein the second oscillator circuit and the second chaotic circuit comprise circuit components selected such that they cause the receiver to synchronize with the transmitter when the transmitter transmits according to the first equilibrium point; and

wherein the detector detects whether the receiver is synchronized and, in response to detecting synchronization, generates a signal.

39. The system of claim 38, wherein the transmitter and the receiver each oscillate chaotically about a single-scroll attractor.

40. The system of claim 38, wherein the transmitter and the receiver each oscillate chaotically about double-scroll attractors.

41. A chaotic receiver comprising:

an input terminal for receiving a chaotically modulated signal;

an oscillating circuit coupled to the input terminal;

a chaotic circuit comprising a capacitor and a negative resistance element, wherein the chaotic circuit is coupled to the oscillating circuit through a resistor, wherein the chaotic circuit causes a voltage to oscillate about an equilibrium point corresponding to a current-voltage characteristic curve of the negative resistance element;

a synchronizing resistor coupled between the input terminal and the negative resistance element; and

a comparator, coupled across the synchronizing resistor, wherein the

comparator generates an output signal when a voltage drop across the synchronizing resistor reaches a predetermined level; and

wherein the synchronizing resistor has a value that satisfies the relation

Rsync $\leq (1/(2f_{LC} \times C_1))$

where f_{LC} is the fundamental frequency of the oscillator circuit, and where C_1 is the capacitance of the capacitor.

42. A chaotic receiver comprising:

an input terminal that receives a modulated chaotic signal;

an oscillator coupled to the input terminal;

a chaotic circuit comprising a capacitor and a negative resistance circuit;

a gain control amplifier coupled between the oscillator and the chaotic circuit, wherein the gain control amplifier amplifies a voltage present at the oscillator before it reaches the chaotic circuit;

a synchronizing resistor coupled between the input terminal and the chaotic circuit; and

a detection circuit, coupled to the synchronizing resistor, wherein the detection circuit detects periods of synchronization and non-synchronization between the modulated chaotic signal and the chaotic circuit and generates an output corresponding to periods of synchronization and non-synchronization.

43. The chaotic receiver of claim 42, wherein the gain control amplifier provides an amplification of between 2.4 dB to 3 dB.

44. A chaotic communication system comprising:

a transmitter that generates a chaotic carrier signal modulated in accordance with an information signal; and

a receiving system having an input terminal that receives the chaotic carrier signal modulated by the transmitter, wherein the receiving system comprises

an oscillator subsystem coupled to the input terminal;

a gain control amplifier coupled to the output of the oscillator subsystem;

a chaotic subsystem coupled to the output of the gain control amplifier;

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 07/21/2005

BANNER & WITCOFF LTD
ELEVENTH FLOOR
1001 G STREET N W
WASHINGTON, DC 022214597

EXAMINER	
ZAND, KAMBIZ	
ART UNIT	**PAPER NUMBER**
2132	

DATE MAILED: 07/21/2005

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/317,124	05/24/1999	DANIEL E. HINTON SR.	00479.77772	8668

TITLE OF INVENTION: CHAOTIC COMMUNICATION SYSTEM AND METHOD USING MODULATION OF NONREACTIVE CIRCUIT ELEMENTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1400	$0	$1400	10/21/2005

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B -. Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007.

Notice of Allowability	Application No. 09/317,124	Applicant(s) HINTON SR. ET AL.	
	Examiner Kambiz Zand	Art Unit 2132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Appeal brief filed on 08/02/2004 & interview conducted on 07/13/2005*.

2. ☒ The allowed claim(s) is/are *3-4,16-17,23,27-28,38-41,43-44,49-56,63-66,70,84,86-88,91-94,98,100,102,106,111-112,118-122,128-129,137-139,143,151,157 and 159, now re-numbered as claims 1-54*.

3. ☒ The drawings filed on *27 February 2001* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 07/29/2004
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *07/13/05 enclosed*.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Kambiz Zand

Claim 101:

Canceled.

Claim 102:

(Currently Amended) A chaotic transmitting circuit, comprising:

an oscillator circuit;

a resistor coupled to the oscillator circuit;

a chaotic circuit coupled to the oscillator circuit through the resistor, wherein the chaotic circuit exhibits a current-voltage characteristic shape having a slope that intersects a load line defined by the resistor and provides an equilibrium point about which a voltage oscillates chaotically; and

a switch coupled to the chaotic circuit, wherein the switch changes a nonreactive resistive value in the chaotic circuit in accordance with an information signal and thereby causes the first equilibrium point to shift to a shifted first equilibrium point, [The apparatus of claim 25,]

wherein the switch sets the non-reactive resistive value to one of a plurality of uniquely coded vectors within a chaotic operating region which, when received at a matched receiver, will generate a corresponding unique code.

Claims 103-105:

Canceled.

Claim 106:

(Currently Amended) A method of transmitting information, comprising the steps of:

(1) in response to receiving a time-varying N-bit code representing a unit of information, selecting a corresponding one of a plurality of 2^N transmitters each of which generates a chaotic strange attractor signal that is distinct from others in the plurality of 2^N transmitters;

(2) transmitting through a communications channel the chaotic strange attractor signal selected in step (1); [(plus reception method, DEH/CPG) The method of claim 103, further comprising the steps of:]

(3) receiving the chaotic strange attractor signal transmitted in step (2);

(4) matching the signal received in step (3) to one of a plurality of 2^N receivers each of which is matched to a corresponding one of the plurality of 2^N transmitters; and

(5) on the basis of the receiver matched in step (4), recovering the N-bit code received in step (1).

Claim 107-110:

Canceled.

Claim 112:

(Currently Amended) A system comprising:

a transmitting system capable of transmitting N bits of information, comprising:

a plurality of 2^N transmitters each of which generates a chaotic strange attractor signal that is distinct from others in the plurality of 2^N transmitters;

a switch which, in response to receiving a time-varying N-bit code representing a unit of information, selects a corresponding one of the plurality of 2^N transmitters; and

a transmission circuit that transmits the selected chaotic strange attractor signal across a transmission channel, and [An information transmission system comprising a transmitting system according to claim 110 and]

a receiving system, comprising: [wherein the receiving system comprises:]

a receiving circuit that receives a time-varying signal comprising a plurality of discrete portions of each of a plurality of chaotic strange attractor signals;

a plurality of 2^N receivers each of which is tuned to one of the 2^N transmitters;

a plurality of detectors each of which detects whether a corresponding one of the plurality of 2^N receivers has received a matching signal; and

a switching circuit which, in response to one of the detectors detecting a corresponding match, generates an N-bit code representing a transmitted unit of information.

Claims 113-117:

Canceled.

Claim 118:

(Currently Amended) A chaotic receiver comprising:

an input terminal that receives a modulated chaotic signal;

an oscillator circuit coupled to the input terminal and driven by the modulated chaotic signal;

a chaotic circuit comprising an upper slope circuit that implements a first current-voltage function in an upper quadrant of a current-voltage response plane and a lower slope circuit that implements a second current-voltage function in a lower quadrant of the current-voltage response plane, wherein the first and second current-voltage functions have a different voltage offset, and wherein the upper and lower slope circuits cooperate with the oscillator circuit to generate a local chaotic signal;

a synchronizing circuit, coupled to the oscillator circuit and the chaotic circuit, wherein the synchronizing circuit detects differences between the modulated chaotic signal at the input terminal and the local chaotic signal;

a detector coupled to the synchronizing circuit which detects periods of synchronization and non-synchronization; [The chaotic receiver of claim 116, further comprising:]

a first analog-to-digital converter coupled to the oscillator circuit;

a second analog-to-digital converter coupled to the upper slope circuit; and

a third analog-to-digital converter coupled to the lower slope circuit;

Claim 120:

(Currently Amended) A chaotic receiver comprising:

an input terminal that receives a modulated chaotic signal;

an oscillator circuit coupled to the input terminal and driven by the modulated chaotic signal;

a chaotic circuit comprising an upper slope circuit that implements a first current-voltage function in an upper quadrant of a current-voltage response plane and a lower slope circuit that implements a second current-voltage function in a lower quadrant of the current-voltage response plane, wherein the first and second current-voltage functions have a different voltage offset, and wherein the upper and lower slope circuits cooperate with the oscillator circuit to generate a local chaotic signal;

a synchronizing circuit, coupled to the oscillator circuit and the chaotic circuit, wherein the synchronizing circuit detects differences between the modulated chaotic signal at the input terminal and the local chaotic signal;

a detector coupled to the synchronizing circuit which detects periods of synchronization and non-synchronization; [The chaotic receiver of claim 116, further comprising:]

a first filter, coupled between the input terminal and the synchronizing circuit, wherein the first filter filters the modulated chaotic signal and produces a filtered modulated chaotic signal;

a second filter, coupled to a first portion of the synchronizing circuit, wherein the second filter filters a buffered version of the filtered modulated chaotic signal; and

a third filter, coupled to a second portion of the synchronizing circuit, wherein the third filter filters a signal generated by the chaotic circuit; and

wherein the detector is coupled to respective outputs of the second and third filters.

Claim 121:

(Currently Amended) A chaotic receiver comprising:

an input terminal that receives a modulated chaotic signal;